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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/575,298 05/19/00 ELENIOUS

P 5833-A-11

EXAMINER

MM91/0927

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ART UNIT

PAPER NUMBER

2811

DATE MAILED:

09/27/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/575,298

Applicant(s)
Elenius et al

Examiner
Nitin Parekh

Art Unit
2811



— The MAILING DATE of this communication appears on the cover sheet with the correspond nc address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Aug 8, 2001
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the applica
- 4a) Of the above, claim(s) 1-15 is/are withdrawn from considera
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 20) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dockerty et al (US Pat. 5796169) in view of Barrow (US Pat. 6118182) and Thompson (US Pat. 5011066).

Regarding claims 16, 17 and 20, Dockerty et al disclose a device/apparatus comprising solder bar/support formed on an upper surface of a first substrate (Flip chip device 3 in Fig. 3 and 4), the substrate having a first electrical contact and solder bar/support being adapted to join the first electrical contact to a second electrical contact on a second substrate (1 in Fig. 1-5), the solder bar/support comprising in combination:

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- a. a first conventional circular solder pad (4 in Fig. 3 and 4) formed on the upper surface of the first substrate, the pad having a center and first predetermined diameter/D
 - b. a second conventional circular solder pad (4 in Fig. 3 and 4) formed on the upper surface of the first substrate, the pad having a center and first predetermined diameter/D, the center of the second pad being spaced from that of the first pad by a predetermined spacing/distance/BL (see the solder bar/support connecting the first and second pads in second column in Fig. 3)
 - c. a solder bar pad of first predetermined width/BW (15 in Fig. 4) formed on the upper surface of the first substrate connecting the first and second circular pads, BW being approximately equal to or slightly less than D (Fig. 4)
 - d. a mass of solder having a volume/VB formed on the first and second conventional circular pads/solder bar pad to form a solder bar/support (16, 17, 18 and other bars/supports connecting two or more pads etc. in Fig. 3 and 4)/VB reaching a height H1 and H2 above the centers of the first and second pads and the midpoint of the solder bar/support respectively
 - e. values for predetermined D, BL, BW are such that H1 is approximately equal to H2 (Fig. 3 and 4; Col. 4, line 50-65), and
 - f. solder bumps/balls (Fig. 4; Col. 4, line 53) having spherical/circular shape having a height H3 where H3 is approximately equal to H1 and H2.
- (Fig. 1-5; Col. 2-5).

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Dockerty et al disclose H1 and H2 being equal (same as the diameter of bump 11; Fig. 4) but fail to specify the value of BW being less than D.

It is a matter of design choice to select the values/dimensions such as D, H1, H2, BW, BL, solder bump volume/VB etc. of various elements including solder pad, solder bar/support, fillet, solder bump, etc. in chip packaging and interconnection technology art to achieve the desired solder bonding strength and reliability.

Barrow teach using a solder joint/bar (26 in Fig. 5) where the solder joint/bar width/BW is less than that of the rectangular pad (pad 18 in Fig. 5). Barrow further discloses the prior art using conventional circular solder pads (Col. 1, line 15).

Thompson teaches using a flattened solder bar/joint (206 in Fig. 2C) having different profile/values for H1, H2 and H3 and the solder bar/joint volume/VB being higher than that of conventional solder bump/VC.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time invention was made to select the solder bar having the value of BW being less than D to improve the solder joint yield/reliability and design requirements using Barrow and Thompson's solder bar structure in Dockerty et al.

The combined teachings of Dockerty et al and Barrow apply to claims 18, 19, 21 and 22 as explained above for claims 16 and 17.

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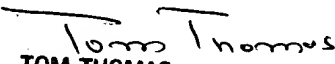
Papers related to this application may be submitted directly to Art Unit 2811 by facsimile transmission. Papers should be faxed to Art Unit via Technology Center 2800 fax center located in Crystal Plaza 4, room 4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is (703) 305-3410. The examiner can be normally reached on Monday-Friday from 08:30 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached on (703) 308-2772. The fax number for the organization where this application or proceeding is assigned is (703) 308-7722 or 7724.

Nitin Parekh

09-25-01


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800